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M-174 COLLECTOR BAG CHANGING

FINAL REPORT

JANUARY 1990

Prepared for:

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
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M-174 COLLECTOR BAG CHANGING

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Process Engineering Technical Report Categories

Ammonium Perchlorate
Cleaning
Collectors
Grinding
Oxidizer

1.0 INTRODUCTION AND SUMMARY

The existing requirement to replace the dust collector bags at 16 RSRM segment intervals is not utilizing the design capacity of the M-174 oxidizer grinding system. This maintenance operation exposes personnel to a severe dust atmosphere in a Class B confined space (baghouse), adds operations cost for new collector bags and labor, and reduces facility utilization availability. It is recommended that the mill static pressure be the determining factor as to when the collector bags in the M-174 oxidizer grinding system need changing.

The M-174 oxidizer preparation facility was designed to support a 60 ACM (air classifying mill) capable of continuously grinding in excess of 6,000 pounds per hour. Two product collectors are provided with the plumbing and an integral diverter valve to alternate product flow during continuous grinding operations. Control of the 60 ACM static pressure which indicates airflow through the grinding mill has not been a problem to date. The collectors are sized with sufficient filter bag area and a continuously operating pulse air bag cleaning system to effectively maintain the system airflow indefinitely.

This maintenance problem has been previously addressed by submitting and receiving approval for Operations Change Requests to extend the bag changing frequency from each segment to eight segments in 1985, from eight segments to 12 segments in 1987, and from 12 segments to 16 segments in 1989. These changes have progressively reduced personnel exposure to undesirable safety conditions with no detrimental effect on the intermediate or final product. The incremental change implementation process is very time-consuming with the objective to determine the functional capacity of the M-174 AP grinding process yet to be established.

The RSRM oxidizer grinding parameters are specified in the manufacturing planning document as follows:

1. Mill Hammer Speed - $2,000 \pm 5$ rpm
2. Mill Separator Speed - 700 ± 2 rpm
3. Mill Static Pressure - 24 ± 1 inch H₂O

The mill static pressure readout provides continuous system airflow status. The dust accumulation on collector bags can progressively restrict the grinding system airflow to a point that the mill static pressure can no longer be maintained. The closed loop system includes a modulating damper adjacent to the blower that, when required, will supplement the airflow to aid in maintaining the mill static pressure. This compensation for restricted airflow will allow any in-process grinding to be completed for a scheduled motor segment. The set(s) of filter bags would be changed after completing the scheduled grinding operations.

2.0 CONCLUSIONS

It has been concluded that:

1. The M-174 bag changing requirements for the oxidizer dust collector units must be minimized to reduce personnel exposure to a high dust environment in a Class B confined space.
2. The current manufacturing planning does not allow operation of the dust collection system to its designed capacity.
3. The current manufacturing planning specifies the grinding parameters required to produce ground oxidizer within specification limits.
4. The requirement to sample each grind for lab analysis will ensure acceptability of the ground product.
5. The mill (60 ACM) static pressure is a viable method to determine the need for collector bag changing.

3.0 RECOMMENDATIONS

It is recommended that:

1. Manufacturing planning specify the use of the mill (60 ACM) static pressure to determine the need for a total collector bag change in the M-174 oxidizer grinding systems.
2. All remaining process and quality control documents remain intact for processing oxidizer in the M-174 facility.

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